

dBQ-zero

TWO CHANNEL EQUALISER WITH FILTER SECTION



User's Manual



dB-SERIES

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User's Manual

version 1.0.0.



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Environmental precaution

EU Directive 2002/96/EC

Remark: This notice applies only to countries within the European Union (EU) and Norway

Electrical and electronic equipment may contain hazardous substances for humans and their environment.

The “crossed out wheellie bin” symbol present on the device and represented above is there to remind one of the obligation of selective collection of waste. This label is applied to various products to indicate that the product is not to be thrown away as unsorted municipal waste. At the end of life, dispose of this product by returning it to the point of sale or to your local municipal collection point for recycling of electric and electronic devices.

Customer participation is important to minimize the potential affects on the environment and human health that can result from hazardous substances that may be contained in this product.

Please, dispose of this product and its packaging in accordance with local and national disposal regulations including those governing the recovery and recycling of waste electrical and electronic equipment. Contact your local waste administration, waste collection company or dealer.

SAFETY ADVICE



CAUTION: To reduce the risk of electric shock, do not remove the cover, back or front. No user serviceable parts inside. Refer servicing to qualified service personnel.

The lightning flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of un-insulated “dangerous voltages” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

IMPORTANT

Do not modify the power cord .

If the power cord does not correspond with the power cord you need or if it is too short to connect to the power socket, please buy a certified power cord at a distributor.

If the power cord is damaged in any way, please replace the cord with a new certified power cord.

If the power cord is not equipped with a power plug, please follow these instructions carefully:

IMPORTANT: The wire colour codes correspond with the following:

GREEN / YELLOW:	GROUND
BLUE:	NEUTRAL
BROWN:	PHASE / LIVE

ATTENTION: This device must be grounded.

If these colours do not correspond with the symbols or colours you are using, please follow the following instructions:

The GREEN / YELLOW wire must be connected to the connector representing the letter E, the grounding symbol (⊥) or the colour GREEN.

The BLUE wire must be connected to the connector represented by the letter N or the colour BLACK.

The BROWN wire must be connected to the connector represented by the letter L or the colour RED.

If in any case you need to replace a fuse, please make sure that you use the same value and that you correctly reposition the protective cover for the fuse.

IN CASE OF DOUBT, PLEASE CONTACT A COMPETENT TECHNICIAN



ATTENTION

- 1) Read instructions - all the safety instructions must be read before the usage of the device.
- 2) Following the instructions - the instructions must be a reference for all that follows.
- 3) Taking the signs into account - all the signs on the device and in the manual must be taken into account.
- 4) Following the instructions - all the following instructions must be followed without exception.
- 5) Cleaning - Disconnect the power cord before all cleaning. Do not use alcohol or benzene to clean the device nor any other liquid. Clean the device with a lightly damp cloth.
- 6) Accessories - do not use accessories that are not certified by the manufacturer or that can cause injuries.
- 7) Water and humidity - The device may not be used near water, for instance near a bath, river, damp room, swimming pool, or any similar environment.
- 8) Stands - do not use an unstable stand. It can fall and injure someone and the equipment may be damaged. Do not use anything other than stands and mounting systems that are certified by the manufacturer or that are sold with the device. Make sure that the mounting of the device is done properly. Observe all safety instructions provided by the the manufacturer.
- 9) A device mounted in a mobile rack must be treated with care. A sudden stop or pushing it too roughly, in combination with a rugged surface can make the rack tip and so injure someone or damage the equipment that is in the rack.
- 10) Ventilation - The perforations in the casing of the device are there to make sure that the device can operate at the correct temperature and cooling of the interior be guaranteed. You must make sure that these openings are not blocked in any way such as by panels or tissues or papers. The device should not be mounted in a closed case where no passive or active ventilation is possible.
- 11) Power - you must connect the device to a power line described in the manual or at the back of the device. If you are not sure that the unit as supplied is correct for your supply voltage, please contact a technician or your local reseller.
- 12) Grounding and polarisation - this device can be equipped with a polarised power connector that only connects one way round which can provide additional safety features. If you are unable to put the power plug into the socket, try it again the other way. If you do not succeed to put the power plug into the socket, ask a

technician. Never try to modify the plug so that it will fit the socket.

- 13) Protection of the power cable - Make sure that the power cable is not damaged in any way, for instance by other machines that are mounted above or below the device.

- 14) Usage - for extra safety and environmental reasons we recommend disconnecting the mains if the device is not being used for a longer period.

- 15) Power overload - do not overload your power lines. Make sure that you do not exceed that maximum load your power cabling can handle. Doing so may pose a fire hazard.

- 16) External objects and liquids - make sure that no external object and/or liquid can enter the device. There is a risk of electrical shock and the machine may be damaged and need servicing. Make sure that you never pour liquids onto the device.

- 17) Maintenance - There is no need to open the machine for servicing. There are no serviceable parts in the machine.

- 18) Repairs - unplug the device and refer to a qualified technician in the following cases:

- a) The power cord is hot or damaged in any way.
- b) An object or liquid has entered the device.
- c) The device was exposed to rain or moisture.
- d) The device does not seem to work properly according to the manual. Do not use more and other commands than you will find in the manual. Contact a certified technician to help you restore the standard commands.
- e) The device has fallen or the chassis is deformed.
- f) The device performs abnormally, showing signs of malfunction.

- 19) Spare parts - if it is necessary to replace certain parts, make sure that only certified parts are used or that the used parts have the same characteristics as the originals. Using incorrect parts can change the device's performance or even destroy it completely.

- 20) Verification - after repairs, make sure to test the device thoroughly. Not only the functionality, but also the safety of the device must be tested.

- 21) Mounting on the ceiling or wall - the device can not be mounted on a wall or ceiling, because this will cover the ventilation perforations causing the device to over-heat.

- 22) Heat - the device must be kept away from all heat sources, such as radiators, stoves or other devices mounted in the same rack including amplifiers.

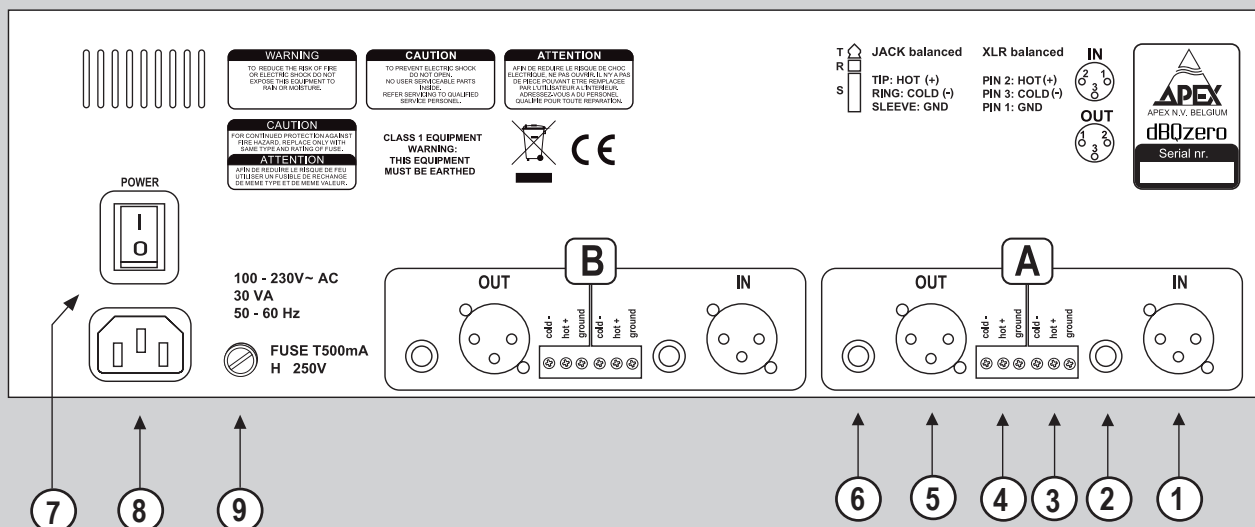
Introduction



Thank you for buying the Apex **dBQzero** equaliser. Apex is manufacturing equalisers since 1991 and has build up a reputation of outstanding quality. With the **dBQzero** we have tried to offer a high-quality dual channel graphic equaliser with some extra filters for a very affordable price. In our humble opinion this is probably the best sounding equaliser in its price range. The unit consist of two identical channels. Each channel consists of a graphic equaliser section with 30 bands, a frequency selectable high pass filter with in/out switch, high and low shelving filters, two notch filters with selectable frequencies and in/out switches, an overall level control and LED VU meter with signal LED and clip LED. If you are used to working with graphic equalisers you will probably be able to operate the unit straight out the box without further reading of the manual. However to get the most out of the **dBQzero**, we invite you to read the rest of this manual.

DESCRIPTION

REAR PANEL



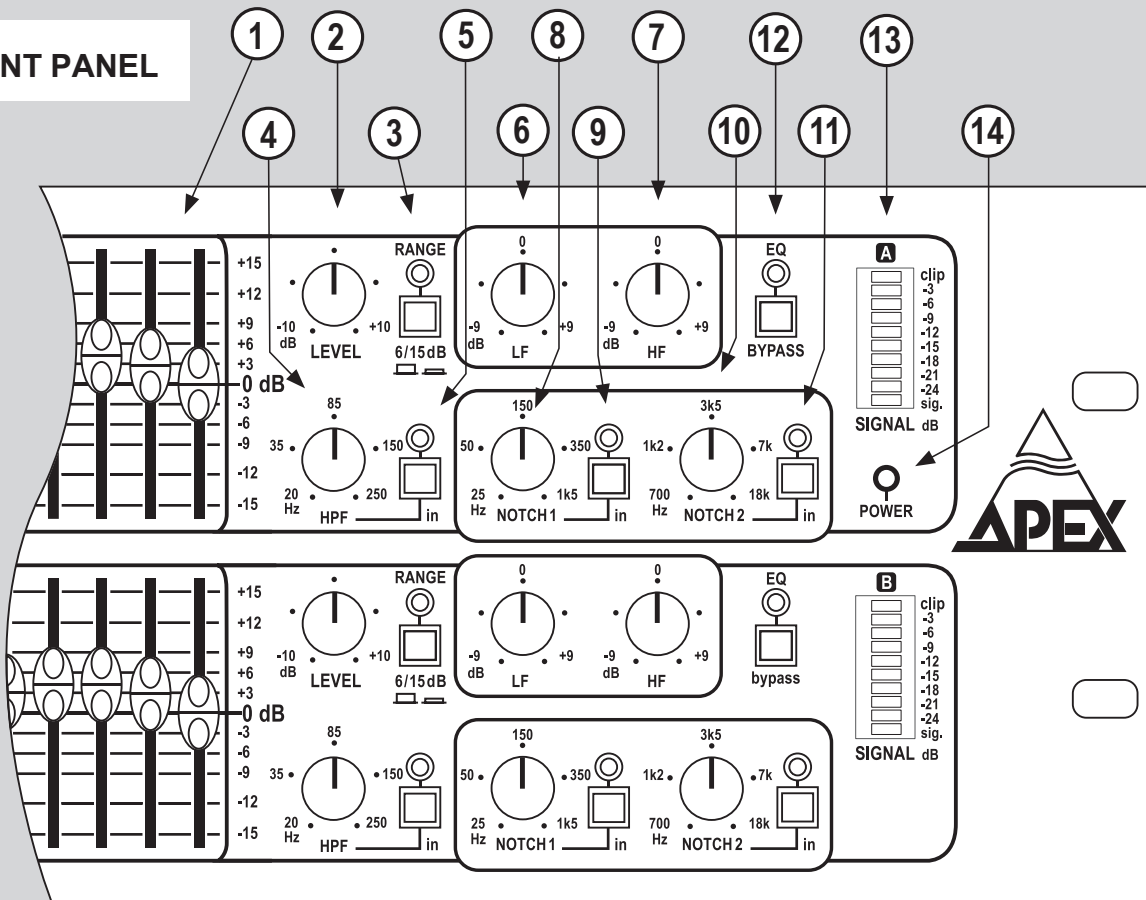
- 1: Balanced input of channel A on XLR-female
- 2: Balanced input of channel A on TRS 6,35 Jack
- 3: Balanced input of channel A on Screw Terminal
- 4: Balanced output of channel A on Screw Terminal
- 5: Balanced output of channel A on XLR-male
- 6: Balanced output of channel A on TRS 6,25 Jack

The identical layout is used for the connections of channel B

- 7: Power switch, turns the unit on or off
- 8: AC inlet 100-240 V AC
- 9: Fuse Holder



FRONT PANEL



- 1: Graphic equaliser section, 30 bands on ISO frequencies
- 2: Input level control
- 3: 6/15dB switch with LED indication changes the maximum boost/attenuation of the graphic Eq
- 4: High Pass Filter frequency selection
- 5: High Pass Filter on/off switch with LED indication
- 6: Low Frequency Shelving filter
- 7: High Frequency Shelving filter
- 8: Low Frequency Notch filter frequency selection
- 9: Low Frequency Notch filter on/off switch with LED indication
- 10: High Frequency Notch filter frequency selection
- 11: High Frequency Notch filter on/off switch with LED indication
- 12: Equaliser Bypass switch with LED indication
- 13: LED VU-meter and Clip LED

The identical layout is used for the connections of channel B

- 14: Power on/present indication LED



Before use...

Mounting the dBQzero in a rack or flight case

The **dBQzero** can be mounted in a standard 19inch rack or flight case via the four holes in the front panel. Use the correct screws (not delivered) and fix the unit with all four screws. For normal use no extra support is needed, but in more extreme conditions "on the road" we advise to support the unit underneath the back. The **dBQzero** will not run very hot in normal operating conditions, but again, under extreme hot temperature conditions we advise you to leave 1U of ventilation space above and under the unit.

Connecting the dBQzero

Connect power to the **dBQzero** via the Power inlet (8), use the power cord provided with the EQ, or get a power cord suitable for use in your country. The **dBzero** has an automatic switchable power supply, which accepts a wide range of AC power: from 100V to 220V. Do not connect the EQ to a 380V power source!!!!

Never replace the fuse in the Fuseholder (9) with a type different than indicated on the back panel.

All audio inputs and outputs of the dBQzero are balanced and use common cabling rules:

XLR: pin 1 = GND, pin 2 = HOT, pin 3 = Cold

JACK: TIP = HOT, RING = COLD, SLEEVE = GND

When making connections in a fixed installation you can gain time and money by directly connecting your cables to the screw terminal connectors.

Turn the unit on via the mains power switch (7), there will be a very short delay before the unit will start working and the equaliser circuit is switched into circuit to avoid loud cracks and bangs. When no power is present or the mains power switch is off, the unit will be/go in hard-bypass mode, hereby linking the inputs to the outputs so that the signal goes true the unit unaltered.



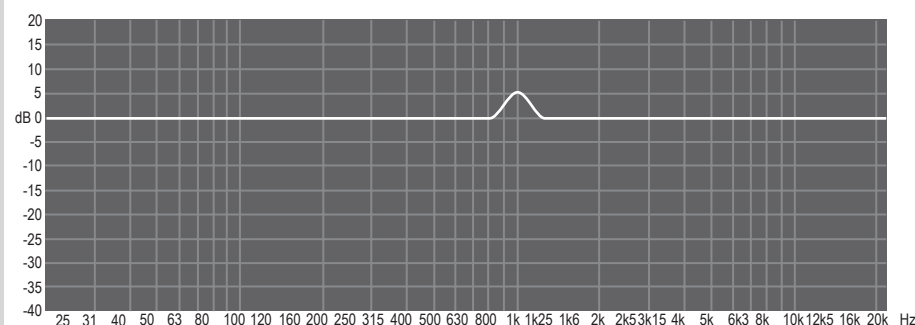
Using the dBQzero

If you are used working with graphic equalisers, using the **dBQzero** will pose you no problem; you will just be surprised by its accuracy and musicality. However if you like to know the fine details of this equaliser, we invite you to read on.

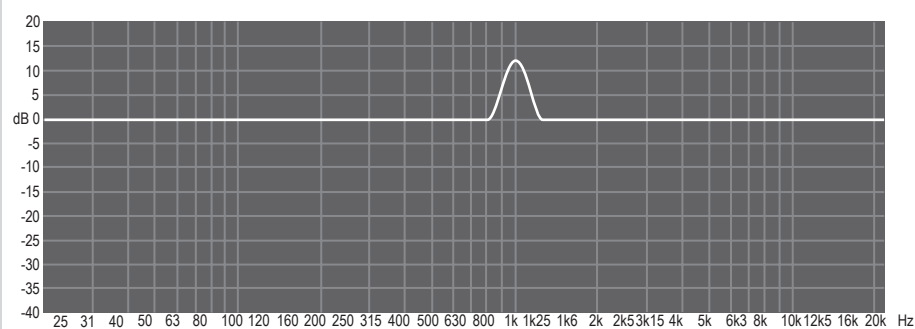
The two channels of the **dBQzero** are identical so only one channel is described.

The Graphic Section (1)

The graphic section consists of 30 faders adjusting the 30 ISO centered frequency bands (1/3rd Octave) with constant Q. But what exactly is this “Q”: Q can be determined as the ratio of filter centre frequency to bandwidth ($Q = f/Bw$). Bandwidth is measured between the 3-dB down points on either side of resonance (and usually where the phase has been shifted $\pm 45^\circ$). If a tuned circuit has a centre frequency of 1 kHz and 3-dB down points at 900Hz and 1.1kHz, the bandwidth = 200Hz and the $Q = 5$ (1000Hz/200Hz). The greater the Q, the smaller the bandwidth. With constant Q, the bandwidth (at the 3-dB down points of each of the graphic filters stays constant, whatever the boost or cut of that filter.



centre frequency of 1kHz, boost of 5dB (all images taken from the Apex IntelliQ digital system optimiser).



centre frequency of 1kHz, boost of 12dB (the bandwidth at the -3dB points stays the same).



All analogue equalisers will introduce some phase shift when used and different equaliser bands will also interact when used together. A graphic equaliser can be considered as a combination of 30 distinct equalisers with fixed centre frequencies and in the case of the **dBQzero** with a constant Q factor. You can only change the gain/attenuation of the filters. This should make it clear why some equalisers (like the **dBQzero**) sound better and more accurate than others. The centre frequencies should be very precisely set; the Q factor really constant and similar for all bands or the interaction between all those filters will create an unpredictable result.

When using a graphic filter for adjusting your sound, start from the lower frequencies and work your way up to the higher ones (work from left to right). Most individual sounds consist of a fundamental frequency and more or less harmonics depending on the nature and/or origin of that sound. When working from left to right you'll make sure to first touch the fundamentals and when altering those you will also act on their harmonics. A good example is mains hum (50Hz or 60Hz), this is mostly a dirty sound with some harmonics: if you work from right to left you will try to get rid of all the harmonics first to finally get to the fundamental. When working from left to right you will get to the fundamental first and take out more or less some of the harmonics, so you will actually use less correction. And with equalising: less is better.

Another good advise is: it is better to cut than to boost. When boosting frequencies or frequency bands you will reduce the overall headroom of your system. If for example you think there is a lack of high frequencies in your sound, you can either push those frequencies or you can cut some of the low frequencies.

And as a last advice: avoid extreme settings between adjacent bands, they will create big phase shifts. Try to make your equalising curve as smooth as possible.

The Level Control (2)

This is an overall gain control, which controls the input level.

The purpose of this control is to be able to adjust the level according to the used overall equalisation. If you have boosted a lot of frequencies, your overall signal will be much hotter and could overdrive the equaliser or the following equipment, adjust your signal with the level control. The same goes of course if you have cut a lot of frequencies, use this control to boost the overall level back to normal.

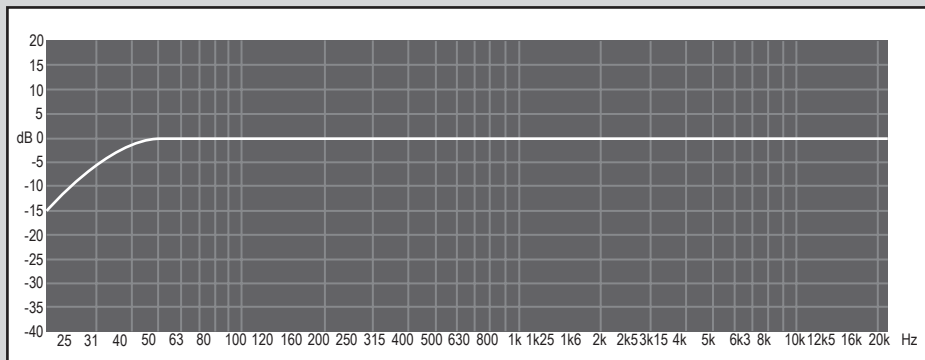


The 6/15 switch with LED indication (3)

Via this switch you can change the scale (maximum boost/cut) of the graphic EQ. In its normal position (LED out) the scale is $\pm 6\text{dB}$: use this scale for minor adjustments but with great precision. When you push the button the LED will light and you will have access to the full scale of the graphic EQ: $\pm 15\text{dB}$.

High Pass Filter Frequency Selection (4)

Via this rotary control you can adjust the high pass filter. This is a filter with a fixed slope of 12dB/octave ; use the control to adjust the cut-off frequency between 20Hz and 250Hz . With this section you can get rid of unwanted low frequency noise such as rumble or microphone handling noise. Again: it is better to use this filter to cut-off low frequency noise than to use several bands of the graphic section since less filters is always better.



high pass filter set at 50Hz

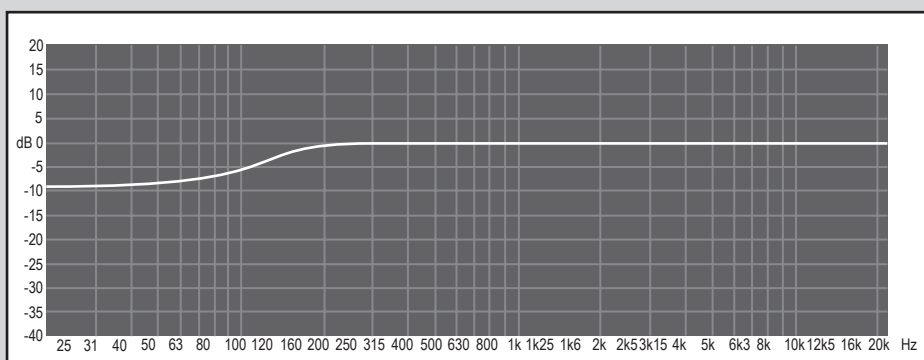
High Pass Filter on/off switch (5)

When the accompanying LED is out, the filter is not in the signal path. Push the switch to activate the filter (the LED will light). You can use this switch to compare between filter in and out to verify if the used setting thus not degrade your musical signal too much.



Low Frequency Shelving Filter (6)

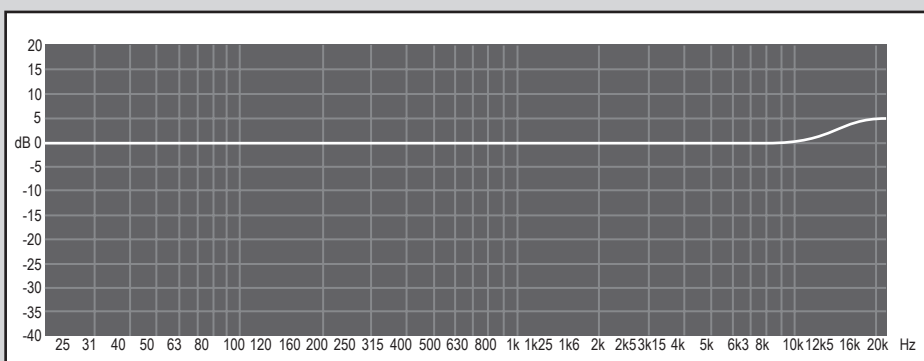
The low frequency shelving filter is a filter with a fixed slope and a fixed frequency at 100Hz. Via the rotary control you can adjust the boost/cut of the filter between +/- 9dB. This filter acts in a similar way as the “bass” control of a hi-fi amplifier; it is great if you are lacking (or having a bit too much) some low end. And again it is only a single filter compared to a number of graphic faders.



low shelving filter with fixed frequency of 100Hz and cut of 9dB

High Frequency Shelving Filter (7)

The high frequency shelving filter is a filter with a fixed slope and a fixed frequency at 14kHz. Via the rotary control you can adjust the boost/cut of the filter between +/- 9dB. This filter acts in a similar way as the “treble” control of a hi-fi amplifier; it is great if you are lacking (or having a bit too much) some high end. And again it is only a single filter compared to a number of graphic faders.



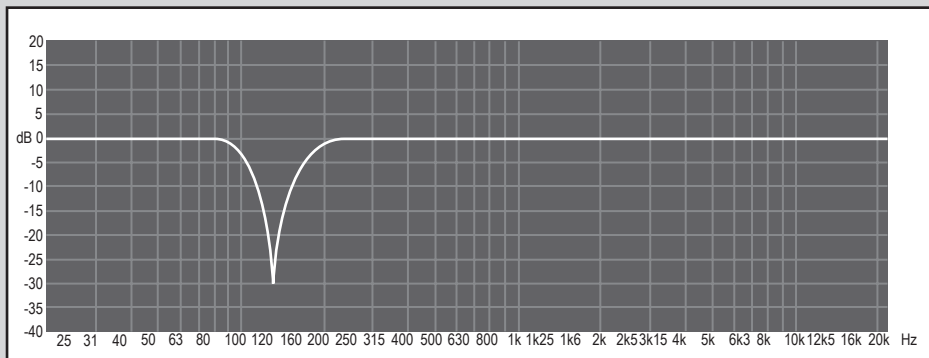
high shelving filter with fixed frequency of 14kHz and boost of 5dB



Low Frequency Notch Filter (8)

This is a parametric filter with 2 fixed parameters: a fixed cut of 30dB and a fixed Q of 2. You can select the centre frequency of the low frequency notch filter between 20Hz and 1200Hz via the rotary control. The purpose of this filter is to quickly remove a feedback frequency. To be able to quickly find the feedback frequency the Q has been chosen to an intermediate value. Reducing this Q would make the filter narrower (thus avoiding cutting out too much musical signal) but it would take too much time for you to find the exact frequency. If you want or need more accurate notch filters we would recommend you our Apex PE analogue models who have full parametric filters who enable you to zoom in on the offensive frequency. Another alternative is our Apex IntelliQ digital system optimiser.

When trying to remove unwanted feedback, start with the low frequency notch filter and then move on to the high frequency notch filter. Feedback mostly consists of more than one frequency, starting with the low frequency notch filter assures you to find the fundamental frequency first. Since the notch filter have a cut of 30dB and a narrower Q than the graphic filters they are much more efficient for removing feedback than the graphic section only.



Notch filter with centre frequency at 140Hz, attenuation of 30dB and $Q = 2$

Low Frequency Notch Filter on/off Switch (9)

With this switch you can turn the low frequency notch filter on and off. Standard position is off (LED out). Push the button if you want to switch the notch filter in the signal path, the LED will light.



High Frequency Notch Filter (10)

This Filter is identical to the Low Frequency Notch Filter except that you can select a higher centre frequency via the rotary control: between 800Hz and 20kHz.

High Frequency Notch Filter on/off Switch (11)

With this switch you can turn the high frequency notch filter on and off. Standard position is off (LED out). Push the button if you want to switch the notch filter in the signal path, the LED will light.

Equaliser Bypass Switch (12)

The bypass switch will connect the input straight to the output, thus bypassing all equalising. In case of Power Failure the bypass is automatically activated

LED-VU meter and Clip LED (13)

There is an eight-section VU meter and one signal LED with a scale in 3dB steps which measures the signal on the output after all the filter sections. A separate Clip LED will light when you have reached the maximum level of the **dBQzero** and no more headroom is left, this Clip circuit monitors the signal at three different points in the signal path: input, post level control and post filters.

If the clip LED lights verify your EQ setting but do not forget to bypass all the filters and make sure your input signal is correct. Check this before the start of any show too make sure you are feeding the unit with a correct level signal.

Power on/present indication LED (14)

When the power switch on the backside of the unit is on, and mains power is present, this LED will light to assure you. In case of a power failure or if you have turned off the mains power switch on the back of the unit, the unit will be/go in hard-bypass mode, hereby linking the inputs to the outputs so that the signal goes true the unit unaltered.



Technical Specifications

Line Inputs:	Balanced high impedance line level input, 10kOhms On 1/4" TRS -jack, XLR and screw terminal connector.
Maximum Input Level:	+20dB Gain adjustable +/- 10dB via rotary control
Line Outputs:	Electronically balanced low impedance outputs
Maximum Output Level:	+21dB into 600 Ohms
Noise:	92dB, 20Hz-20kHz, A-weighted
Crosstalk:	Better than 80dB
THD:	< 0,005%, 20Hz - 20kHz
Frequency Response:	+/- 0,5 dB 20Hz - 20kHz, all controls flat
Power Supply:	Auto-detect 110/230V - 50/60Hz, switching power supply Power switch and fuse on the back panel Power LED on the front panel
Dimension (H x W x D):	3U rack Case x 483mm (19inch) x 133mm (5,25inch)
Weight:	4 kg



WEEE & RoHS Compliance Certificate

For Apex dBQ-Zero
Paragraphic Equaliser
Code Number 80 00 11 000010

01-06-2006

Apex NV
Schoebroekstraat 62
3583 Paal-Beringen
Belgium



WEEE

Apex shall be WEEE compliant, based on EU regulation 2002/96/EC
On 01-07-2006

All our products will have the WEEE directive label placed on the case.
So the products can be returned to Apex if the product have reached the "end of use"
at the end of the life cycle

RoHS

Based on information provided by our suppliers, Apex indicates the dBQ-Zero
as **RoHS compliant** for orders placed on or after the date of this certificate.

RoHS compliant means that:

- Our supplier has confirmed that the product concerned is RoHS compliant.
- We apply rigorous and persistent processes to confirm and document this.
- Wherever applicable we perform material content tests.

Soldering

Apex only uses Lead-Free Soldering Techniques . See norm IEC 61760 Lead free
wave soldering

PCB

Apex only use RoHS Compliant and compatible PCB's
Lead free finishes & lead free laminate requirements

Component Checking

We assembly and purchased components with RoHS Compliant certification
"For these purposes the maximum concentration values of the limited substances as
to weight in homogeneous materials are as follows:

Lead	0.1%
Mercury	0.1%
Hexavalent Chromium	0.1%
Polybroombifenylen	0.1%
Polybroomdifenylethers	0.1%
Cadmium	0.1%

Apex takes all possible steps to document the supplier statement

This document is made for the distributors of Apex products ,see above product

Paul Van Hees
Director

Edition 0.1 01-06-2006

Document # 90 44 11 000010

